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(54) Supporting device, particularly for sports shoes

(57) A supporting device, particularly for sports shoes, which is constituted by a plurality of elements (3) that are axially and elastically connected to each other. The elements (3) are associated longitudinally with respect to the rear region of the shoe and have a curved shape at their mutual joining region. This device allows to control the articulation of the ankle, and particularly to control the longitudinal and lateral flexibility of the shoe.

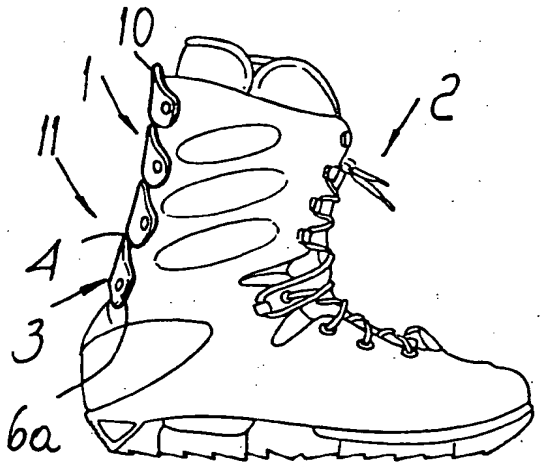

Fig. 3

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Description

The present invention relates to a supporting device, particularly for sports shoes.

The technical need to control flexibility in sports shoes, for example ski boots or snowboarding boots, is currently felt.

In the first case, control is performed only on longitudinal flexibility, since skiing requires the boot to be laterally rigid in order to allow optimum transmission of efforts for steering the ski.

In the second case, control is performed both on longitudinal flexibility and on lateral flexibility, since snowboarding requires the ankle joint to be free in all directions, in order to allow the shifts in the center of gravity of the athlete's body that are required to steer the board.

FR-1,126,589 dicloses a ski boot in which at the rear region of the upper there is an opening that forms two flaps that can be mutually fastened by means of laces. Laterally to the upper there are adapted slightly tilted pockets inside which there are bars, whose purpose is to stiffen said upper, transmitting most of the reaction for ski tilting directly to the leg, limiting the component of the torsion stress that affects the ankle during this step of skiing.

This solution, however, does not allow control of the longitudinal articulation of the ankle, which is entirely entrusted to the flexing of the boot, whereas the lateral articulation of the ankle is inhibited by the presence of the stiffening bars.

FR-1,193,946 discloses a ski boot that comprises reinforcement elements that are arranged substantially at the lateral surface of the upper that affects the ankle region. Even this solution, however, is not optimum, since despite controlling the longitudinal articulation of the ankle and stiffening the upper laterally, said elements act directly on said upper, so as to produce localized pressure regions that can cause discomfort or damage to the ankle; the solution is also constructively complicated.

US-3,747,235 discloses a device that allows to use a low shoe which, in combination with a lever affecting the rear region of the leg and associated therewith at the calf, allows to control the longitudinal flexing of the user's leg and to effectively transmit efforts to the ski, once the shoe has been associated with a ski.

This solution, too, has a drawback that is due to constructive complexity and to the fact that only the longitudinal articulation of the ankle is controlled, whereas lateral articulation is fully inhibited.

FR-2,358,119 discloses a ski boot that comprises a rear quarter that is divided transversely into three separate elements that can partially slide with respect to each other in a longitudinal direction.

This solution, too, does not fully solve the described technical problems; although it allows to facilitate forward flexing of the leg and allows limited control of backward flexing, since once said elements interact with each other by mutual abutment further backward flexing is contrasted exclusively by the deformability of said quarter, there is no possibility of allowing and controlling lateral articulation of the ankle.

Another solution is shown in US-5,193,294 in the name of this same Assignee, which discloses a ski boot that comprises a quarter that is composed of two or more independent strap elements that are associated with each other and/or with a shell in an oscillating manner; there are also two lateral stiffening bars.

Even this solution, however, has drawbacks: despite allowing to control the longitudinal and lateral articulation of the ankle, it entails a considerable constructive complexity of its individual elements and of their assembly, and has accordingly high production costs.

The aim of the present invention is therefore to solve the described technical problems, eliminating the drawbacks of the mentioned prior art, by providing a device, particularly for sports shoes, that allows to perform active control of the articulation of the ankle both longitudinally and laterally.

Within the scope of this aim, an important object is to provide a device that allows, while walking in sports shoes, to avoid possible sprains and at the same time allows, during sports practice, to control the longitudinal and lateral flexibility of the shoe.

Another important object is to provide a device that is structurally simple and can be industrialized easily.

Another important object is to provide a device that is easily associable with the shoe.

Another object is to provide a device that associates with the preceding characteristics that of being reliable and safe in use and can be obtained with conventional and known machines and facilities.

This aim, these objects, and others which will become apparent hereinafter are achieved by a supporting device, particularly for sports shoes, characterized in that it comprises a plurality of elements axially and elastically connected to each other and longitudinally associated with the rear region of said shoe, said elements having, at their mutual joining region, a curved shape that is adapted to allow an abutment between them upon a lateral oscillation applied to said shoe.

Further characteristics and advantages of the invention will become apparent from the detailed description of some particular but not exclusive embodiments, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a plan view of the device;
figure 2 is a rear view of a sports shoe, such as a climbing boot or a soft shoe for snowboarding, with the device applied thereto;
figure 3 is a side view of the shoe of figure 2;
figure 4 is a view, similar to figure 2, of a shoe with a different form of provision;
figure 5 is a sectional view, taken along the plane V-V of figure 4;

figure 6 is a side view of the shoe of figure 4;

figure 7 is a lateral perspective view of a further embodiment of the device;

figure 8 is an inside view of the device of figure 7, in which a component has been omitted for the sake of clarity;

figure 9 is a sectional view, taken along the plane IX-IX of figure 7;

figure 10 is a lateral perspective view of the component omitted in figure 8;

figure 11 is a side view of a shoe with the device applied thereto, wherein the presence of a spring has been pointed out for the sake of clarity;

figure 12 is a view, similar to figure 7, of another embodiment of the device;

figure 13 is a sectional view, taken along the plane XIII-XIII of figure 12;

figure 14 is a schematic view of the behavior of the device upon longitudinal flexing of the foot;

figure 15 is a schematic view of the operation of the device upon lateral flexing;

figure 16 is a view similar to figure 12 of a further embodiment;

figure 17 is a schematic side view showing the operation of the device of figure 16.

With reference to the above mentioned figures, the reference numeral 1 designates the supporting device, which is particularly usable for sports shoes 2 such as snowboard shoes, trekking boots, athletic shoes, climbing boots, etcetera, that allow full articulation of the ankle.

The supporting device is constituted by two or more elements, designated by the reference numeral 3, that are mutually axially and elastically connected by means of an adapted bridge 4.

Said elements are obtained, for example, by thermoforming plastic material and are substantially arc-shaped.

Each one of said elements thus comprises a body 5, from which two first tabs 6a and 6b protrude laterally; a recess 7 is advantageously formed in the body 5, and appropriate first holes 8a and 8b, adapted to allow the coupling of said elements to the shoe 2, are provided proximate to the tips of the first tabs 6a and 6b.

The bridge 4 thus connects the lower edge 9 of each body 5 to the upper edge 10 of the underlying body 5, preferably at a longitudinal median axis.

The device therefore has a substantially longitudinal arrangement and is preferably associatable at the rear region 11 of the shoe at its longitudinal median axis.

In each one of the elements 3, furthermore, the lower edge 9 and the upper edge 10, in the embodiment illustrated in figure 1, are substantially shaped like a circular arc in which the radius R_1 of the lower edge 9 is different from the radius of curvature R_2 of the upper edge 10.

The difference of these radii of curvature allows each element 3 to rotate with respect to the contiguous one; in this manner, each element can oscillate, for example as a consequence of a lateral flexing, until said oscillation causes mutual abutment between the lower edge of one element and the upper edge of the contiguous one.

The longitudinal connection between the individual elements instead allows to control the longitudinal flexibility of the shoe.

Advantageously, the recess 7 of each element 3 can be arranged at a complementarily shaped raised portion 12 that protrudes to the rear of the upper 2.

It has thus been observed that the invention has achieved the intended aim and objects, a device having been obtained that allows to optimally support the user's ankle and leg and to effectively control the articulation of said ankle in all directions: it is in fact possible to control the lateral articulation of the ankle, since the extent of its oscillation is determined by the sum of the differences of the radii of curvature R_1 and R_2 of the elements that constitute the supporting device; motion recovery is also facilitated by means of the bridges 4.

A control linked to the axial deformability of said device can be performed for articulation in a longitudinal direction as well.

The supporting device is of course susceptible of numerous modifications and variations, within the scope of the same inventive concept.

Thus, for example, figures 7, 8, 9, 10, and 11 illustrate a supporting device 101 that is constituted by a first upper element 103a, by a second central element 103b, and by a third lower element 103c that are mutually separate.

Said first, second, and third elements are constituted by a body 105 that has a substantially ellipsoidal shape and has a pair of first tabs 106a, 106b, 106c, and 106d in the first upper element 103a and in the third lower element 103c, at the lateral ends.

Said pairs of tabs have, proximate to their tips, adapted first holes 108a, 108b, 108c, and 108d for connection to the sports shoe.

Advantageously, the pair of first tabs 106a and 106b of the first upper element 103a has a lower edge 109 whose radius of curvature is equal to, or different from, that of the upper edge 110 of the pair of first tabs 106c and 106d of the third lower element 103c but is centered on the opposite side.

The first upper element 103a, the second central element 103b, and the third lower element 103c have, at the surface 113 that can be arranged adjacent to the sports shoe, a first seat, designated by the reference numerals 114a, 114b, and 114c, that is formed along the same axis that lies longitudinally to the supporting device 101.

Said first seats are therefore mutually aligned and are preferably substantially W-shaped in transverse cross-section; adapted pairs of second holes 115a,

115b, 115c, 115d, 115e, and 115f are formed at said seats along two mutually parallel axes.

Said first seats 114a, 114b, and 114c allow to accommodate therein a complementarily shaped connecting element 116 that has means for connecting to the first upper element, to the second central element, and to the third lower element; said means are constituted by a plurality of mushroom-shaped studs 117 that can be selectively and detachably inserted at the appropriately provided second holes 115a, 115b, 115c, 115d, 115e, and 115f formed on said first, second, and third elements.

Advantageously, said connecting element 116 has adapted annular partitions 118a and 118b that are adapted to keep the first upper element 103a, the second central element 103b, and the third lower element 103c mutually separated.

A second axial seat 119 and a third axial seat 120 are also formed on the connecting element 116 along two axes that are mutually parallel and approximately match the axes along which the mushroom-shaped studs 117 lie; said seats 119 and 120 are meant to contain adapted flexible elements, such as for example a first spring 121 and a second spring 122.

Since the connecting element 116 is also flexible, this embodiment, too, allows to achieve the intended aim and objects, control of longitudinal and lateral flexing being entrusted predominantly to the connecting element and to the first and second springs.

Figures 12, 13, 14, and 15 illustrate another embodiment for a supporting device 201, which is constituted by a first upper element 203a, a second central element 103b, and a third lower element 203c that are mutually separate.

Said first, second, and third elements are constituted by a body 205 that has a substantially ellipsoidal shape and has, in the first upper element 230a and in the third lower element 203c, at the lateral ends, a pair of first tabs 206a, 206b, 206c, and 206d.

Said pairs of tabs have, proximate to their tips, adapted first holes 208a, 208b, 208c, and 208d for connection to the sports shoe.

Advantageously, the pair of first tabs 206a, 206b of the first upper element 203a has a lower edge 209 whose radius of curvature is equal to, or different from, that of the upper edge 210 of the pair of first tabs 206c and 206d of the third lower element 203c, but is centered in the opposite direction.

Like the previous solution, the first upper element 203a, the second central element 203b, and the third lower element 203c have a seat, at the surface that can be arranged adjacent to the sports shoe; said seats are mutually aligned and are meant to accommodate a complementarily shaped connecting element 216, which has means for connecting to the first upper element, to the second central element, and to the third lower element; said means are constituted by a plurality of mushroom-shaped studs 217 that can be selectively and detachably inserted at the suitable second holes formed on said first, second and third elements.

A second axial seat and a third axial seat are also formed on the connecting element 216 along two mutually parallel axes that approximately match the axes along which the mushroom-shaped studs 217 are arranged; said seats are meant to contain adapted flexible elements, such as for example a first spring 221 and a second spring 222.

The second central element 203b is constituted by a body 205 that has coupling means for complementarily shaped engagement means provided in said first upper element 203a and in said third lower element 203c; the coupling means are constituted by two second tabs 223a and 223b that protrude away from the body 205 along a median plane that lies longitudinally with respect to the device and have holes at their tips.

Said tips of said pair of second tabs 223a and 223b can be arranged outside said first upper element 203a and said third lower element 203c or at an adapted pair of third seats 224a and 224b formed inside said elements starting from their respective lower and upper edges 209 and 210.

The engagement means are constituted by adapted lugs that protrude outside said first upper element 203a and said third lower element 203c at the perforated tips of the second pair of tabs, or by adapted rivets 223a, 223b that pass at adapted holes provided on said first upper element 203a and said third lower element 203c and said second pair of tabs, said rivets being adapted to mutually lock said components.

In this case, too, it is possible to control the longitudinal and lateral articulation of the ankle; in the first case, it is possible to hypothesize achieving a stroke that is equal to an acute angle Ω, as shown in figure 14, whereas in the second case the device is allowed a variation through an angle β before the body 205 of the second central element 203b interacts by abutment against the lower edge 209 of the first upper element 203a and the upper edge 210 of the third lower element 203c, as shown in figure 15.

This solution, too, allows to achieve the intended aim and objects.

The structure of the supporting device described for the embodiments of figures 7-11 and figures 12-15 can of course include a plurality of elements, from a minimum of two, depending on the height of the shoe and on the ankle control and support requirements.

Figures 16-17 illustrate a further embodiment of the device, designated by the reference numeral 301, which is substantially similar to the device 201 described above and wherein the same reference numerals designate similar elements.

The device 301 is substantially similar to device 201, except that the rivets 225a, 225b, connecting the second tabs 223a, 223b to the first upper element 203a and the third lower element 203c respectively, are slideable in adapted slots 333a, 333b formed in elements 203a and 203c respectively.

In this manner, elements 203a and 203c are allowed to slide longitudinally and to rotate.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. Supporting device, particularly for sports shoes, characterized in that it comprises a plurality of elements (3,103,203) axially and elastically connected to each other and longitudinally associated with the rear region of said shoe, said elements having, at their mutual joining region, a curved shape that is adapted to allow an abutment between them upon a lateral oscillation applied to said shoe.

2. Device according to claim 1, characterized in that said elements are mutually axially and elastically connected by means of at least one adapted flexible bridge (4).

3. Device according to claim 2, characterized in that each one of said elements comprises a body (5) from which two first tabs (6a,6b) protrude laterally, said tabs having, proximate to their tips, adapted first holes (8a,8b) that allow the coupling of said elements to said shoe.

4. Device according to claim 3, characterized in that a recess (7) is formed on said body and can accommodate a complementarily shaped raised portion (12) that protrudes to the rear of the upper (2) of said shoe.

5. Device according to claim 3, characterized in that said at least one bridge (4) connects the lower edge (9) of each body (5) to the upper edge (10) of the underlying body (5), preferably at a longitudinal median axis.

6. Device according to one or more of the preceding claims, characterized in that in each one of said elements (3), said lower edge (9) and said upper edge (10) are substantially shaped like a circular arc with radii of curvature, respectively R_1 and R_2, that are centered on the same side or on opposite sides.

7. Device according to claim 6, characterized in that said radius R_1 of said lower edge (9) is different from said radius R_2 of said upper edge (10), so as to allow each one of said elements (5) to rotate with respect to the contiguous one, so as to allow oscillation, upon lateral flexing, until said oscillation causes the mutual abutment of said lower and upper edges of two of said contiguous elements (3).

8. Device according to one or more of the preceding claims, characterized in that it comprises a first upper element (103a), a second central element (103b), and a third lower element (103c) that are mutually separate.

9. Device according to claim 8, characterized in that said first (103a), second (103b), and third (103c) elements are constituted by a body (105) that has a substantially ellipsoidal shape which has, in said first and third elements, at the lateral ends, two first tabs (106a), proximate to the tips of which adapted first holes are provided for connection to said shoe by virtue of known engagement means such as rivets.

10. Device according to claim 9, characterized in that said pair of first tabs (106a,106b) of said first upper element (103a) has a lower edge (109) whose radius of curvature is centered in the opposite direction of that of said upper edge (110) of said two first tabs (106c,106d) of said third lower element (103c).

11. Device according to claim 10, characterized in that said first upper element (103a), said second central element (103b), and said third lower element (103c) have, at the surface (113) arranged adjacent to said sports shoe, a first seat (114) formed along the same axis that lies longitudinally with respect to said supporting device (101), said first seats being mutually aligned and preferably having, in transverse cross-section, a substantially W-like shape, adapted pairs of second holes (115) being formed at said seats along two mutually parallel axes.

12. Device according to claim 11, characterized in that said first seats (114a,114b,114c,114d) allow to accommodate therein a complementarily shaped connecting element (116) that has means for connecting to said first upper element, to said second central element, and to said third lower element, said means being constituted by a plurality of mushroom-shaped studs (117) that can be selectively and detachably inserted at adapted second holes (115) formed on said first, second, and third elements.

13. Device according to claim 12, characterized in that said connecting element (116) has adapted annular partitions (118a,118b) that are adapted to keep said first upper element, said second central element, and said third lower element mutually separated.

14. Device according to claim 12, characterized in that a second axial seat (119) and a third axial seat (120) are formed on said connecting element (116) along two mutually parallel axes that approximately correspond to the axes of arrangement of said mushroom-shaped studs (117), said second and third seats being meant to contain adapted flexible elements, such as a first spring (121) and a second spring (122).

15. Device according to one or more of the preceding claims, characterized in that said second central element (203b) is constituted by a body (205) that has coupling means for complementarily shaped engagement means that are provided in said first upper element (203a) and said third lower element (203c), said coupling means being constituted by two second tabs (223a,223b) that protrude on opposite sides of said body and along a median plane that lies longitudinally to the device, said tabs having holes at their tips.

16. Device according to claim 15, characterized in that said tips of said two second tabs (223a,223b) can be arranged outside said first upper element (203a) and said third lower element or at an adapted pair of third seats (224a,224b) formed inside said elements starting from their respective lower and upper edges (209,210).

17. Device according to claim 16, characterized in that said engagement means are constituted by adapted lugs that protrude outside said first upper element (203a) and said third lower element (203c) at the perforated tips of said second pair of tabs, or by adapted rivets (225a,225b) that pass at adapted holes that are formed on said first upper element and said third lower element and said second pair of tabs, said rivets being adapted to mutually lock said components.

18. Device according to one or more of the preceding claims, characterized in that it allows to achieve a longitudinal flexing that is equal to an acute angle Ω, and to achieve a lateral flexing that is equal to an angle β before the body (205) of said second central element interacts by abutment against the lower edge (209) of said first upper element (203a) and the upper edge (210) of said third lower element (203c).

19. Device according to claim 17, characterized in that said rivets (225a,225b) are adapted to slide at respective slots (333a,333b) formed on said first upper element (203a) and on said third lower element (203c).

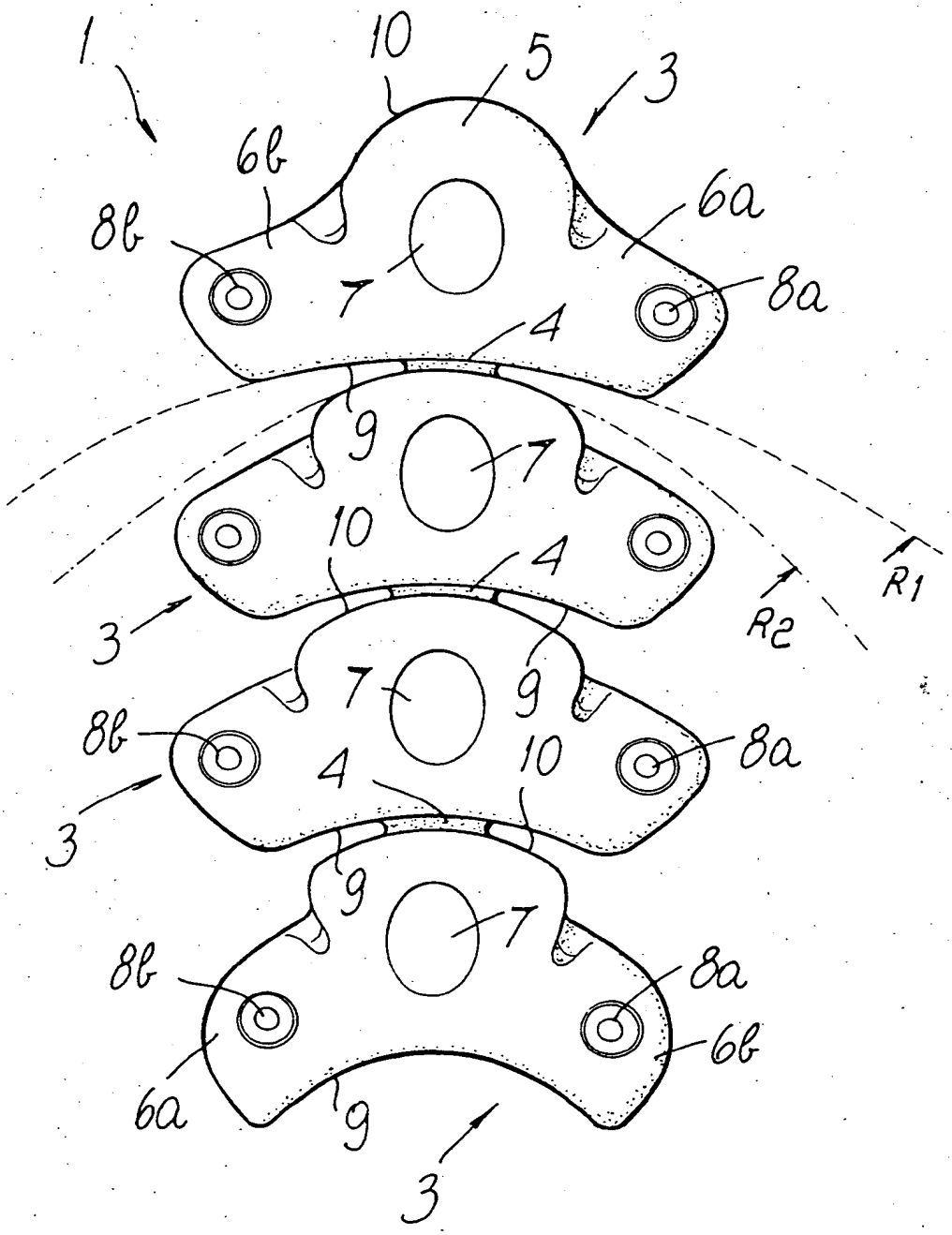

Fig. 1

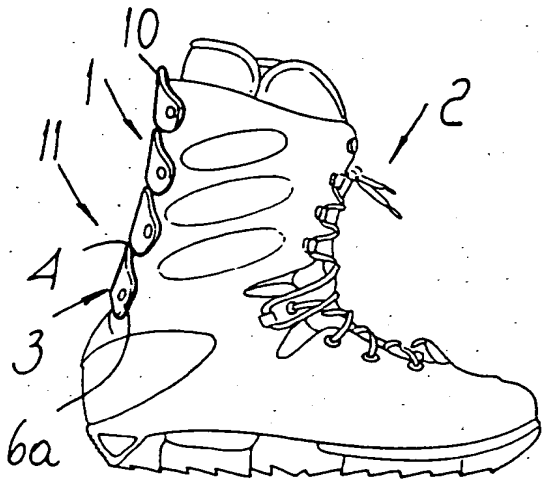

Fig. 3

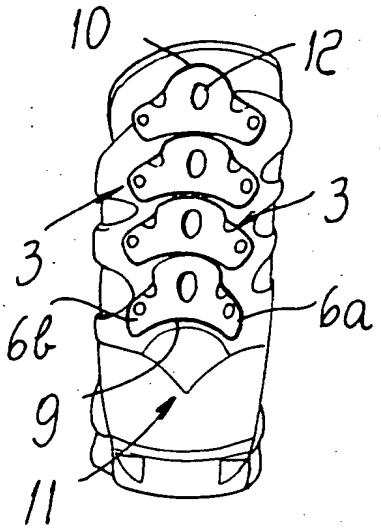

Fig. 2

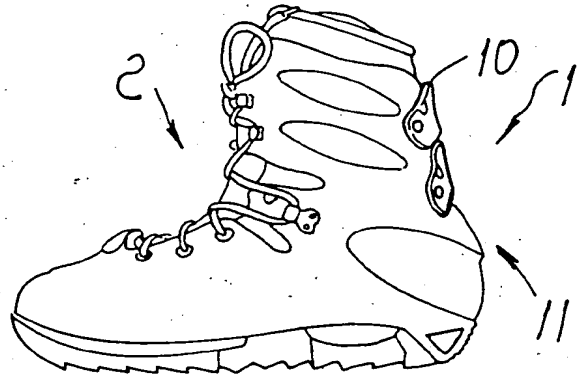

Fig. 6

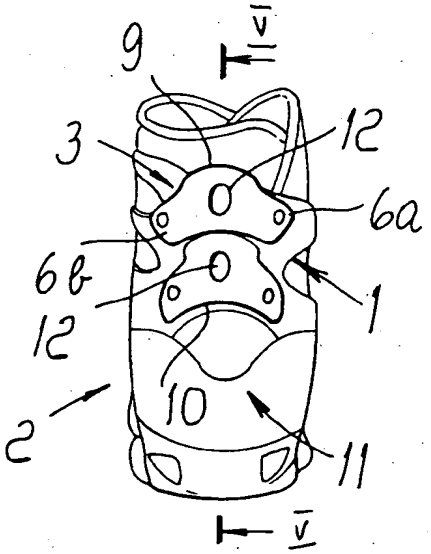

Fig. 4

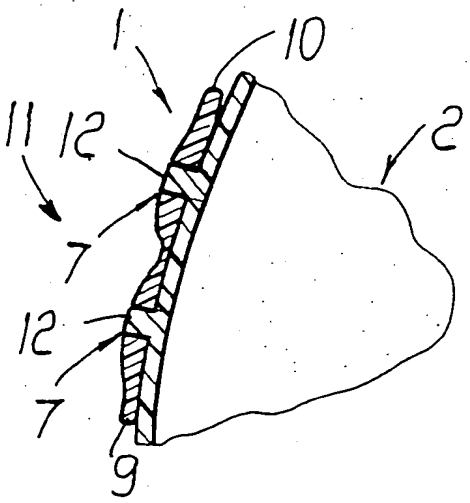

Fig. 5

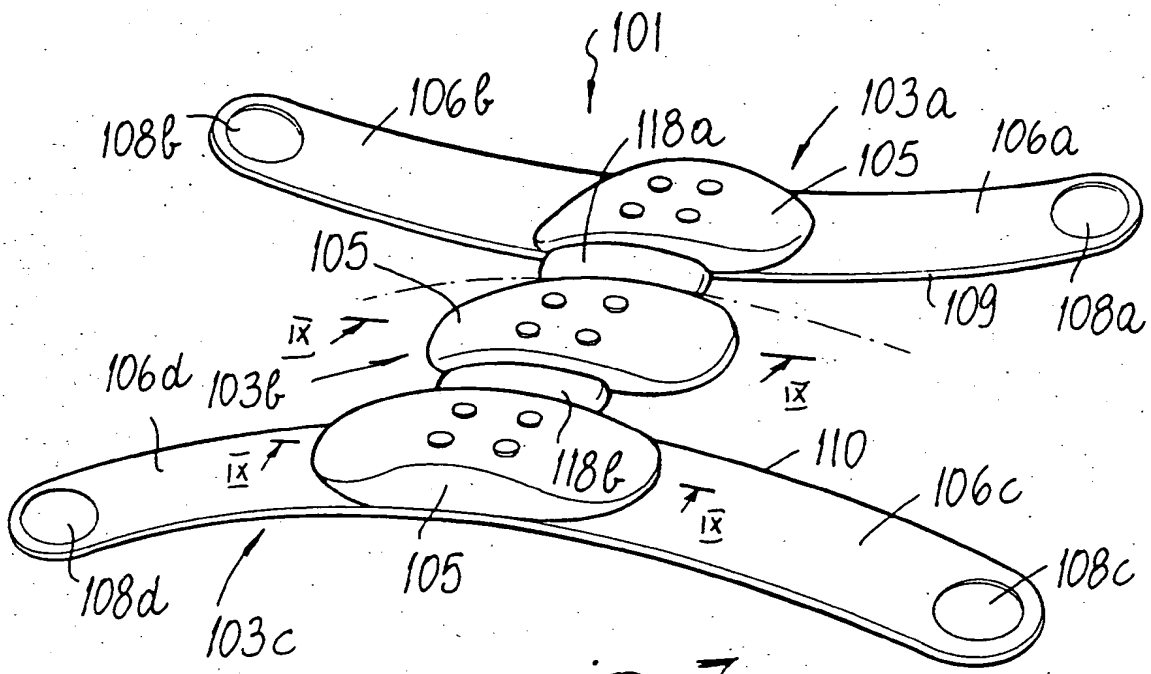

Fig. 7

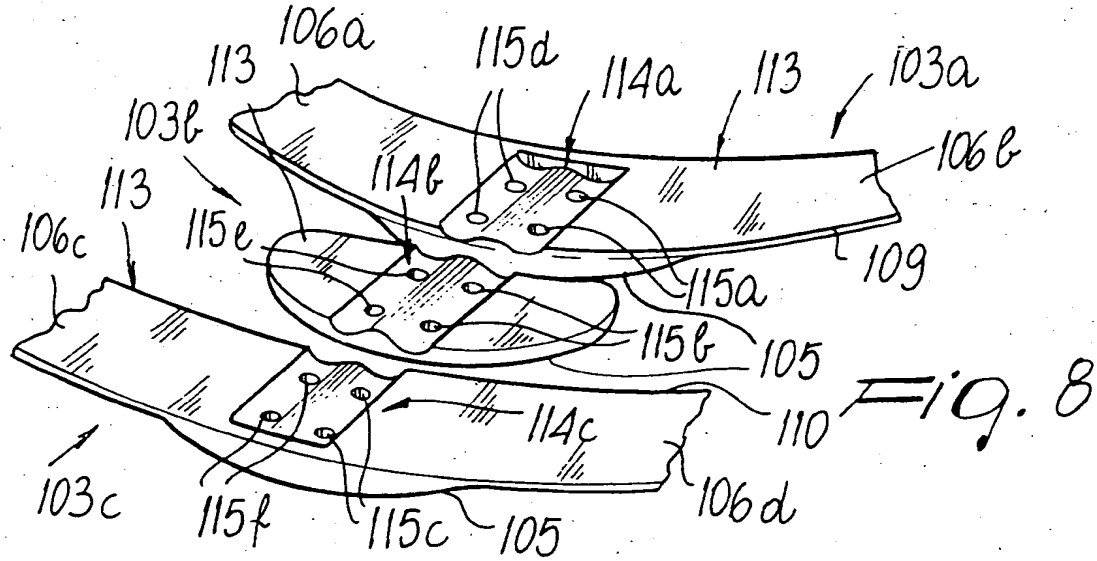

Fig. 8

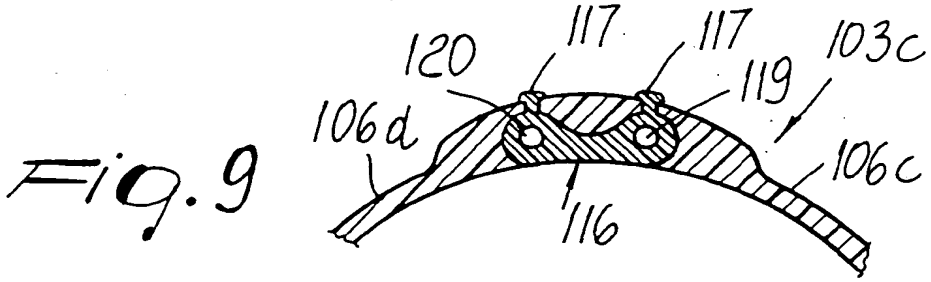

Fig. 9

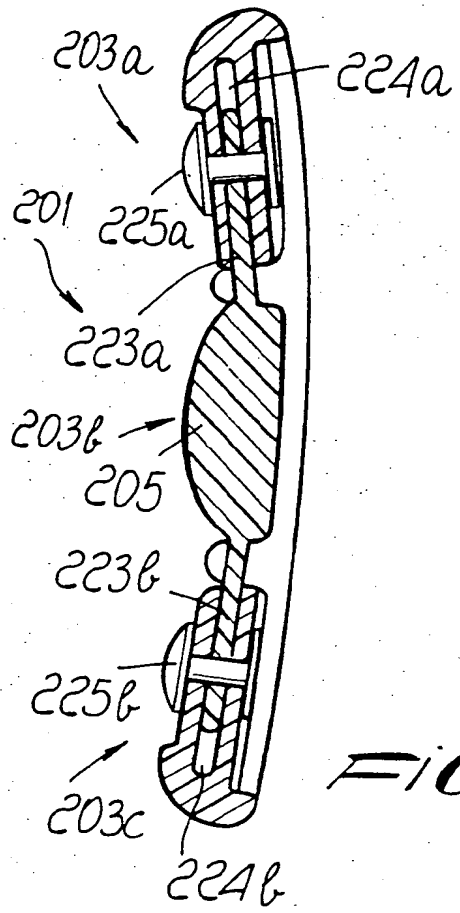

Fig. 13

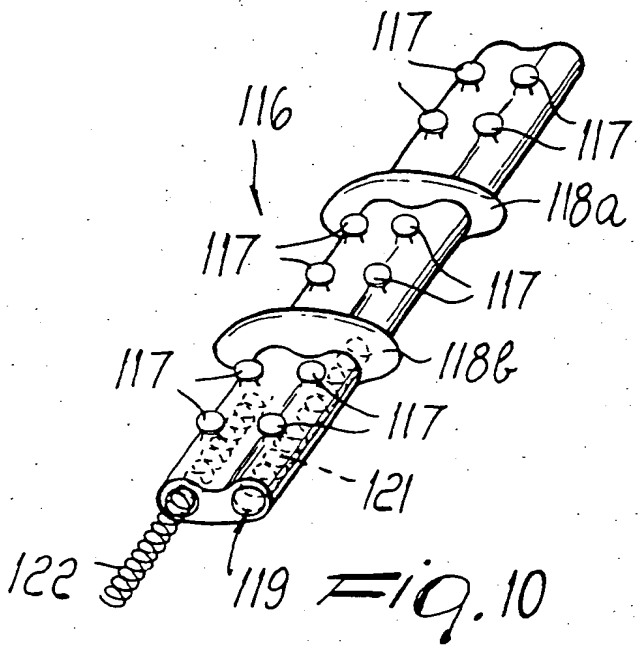

Fig. 10

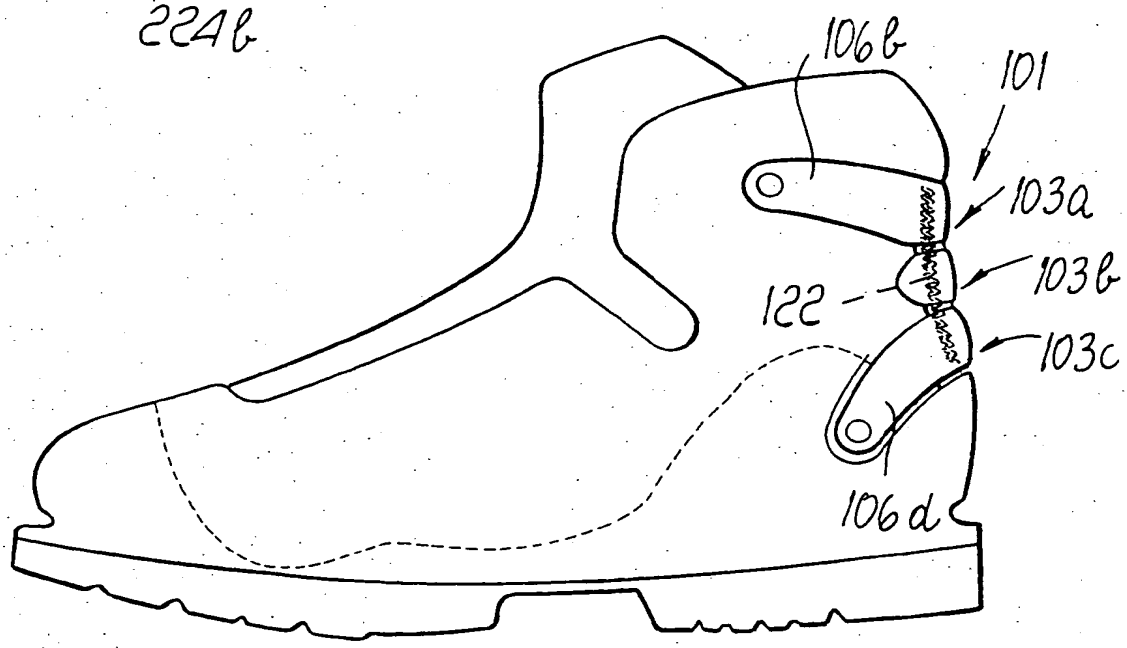

Fig. 11

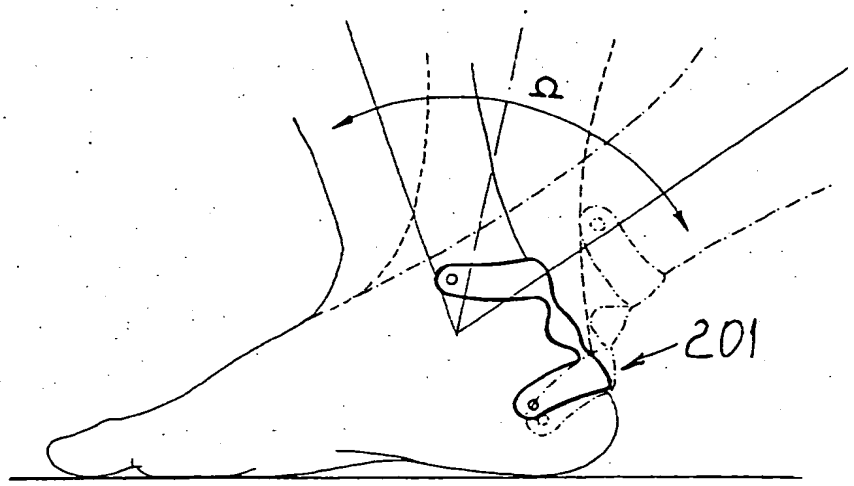

Fig. 1A

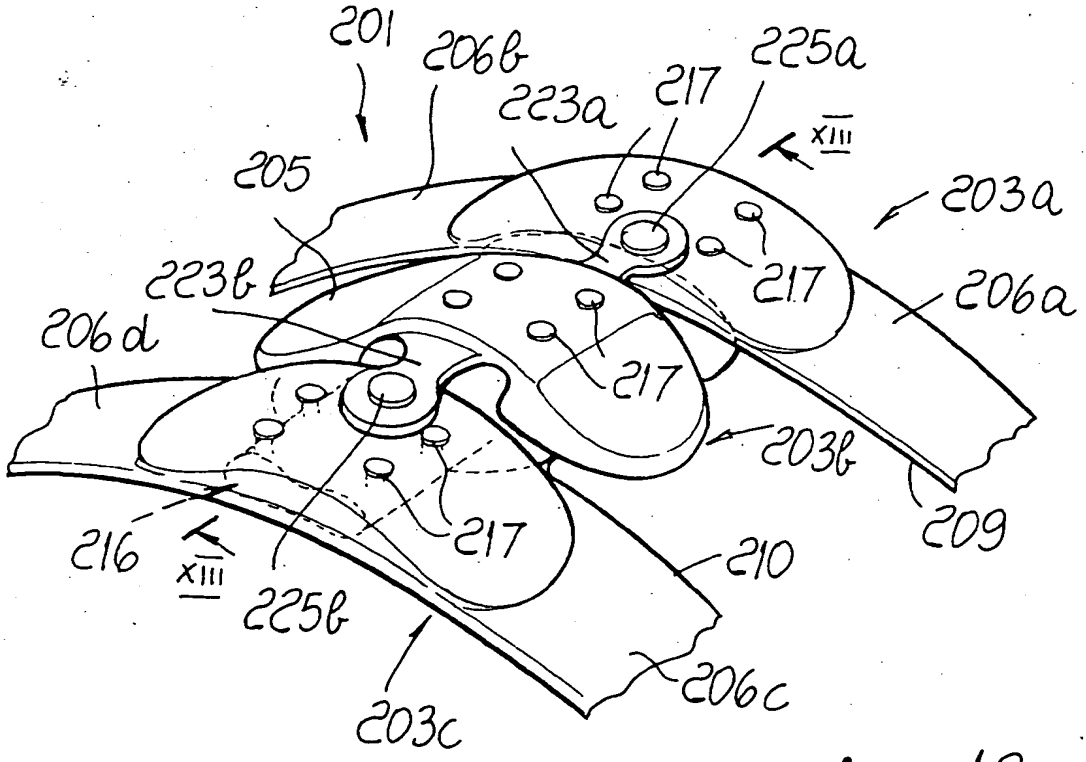

Fig. 12

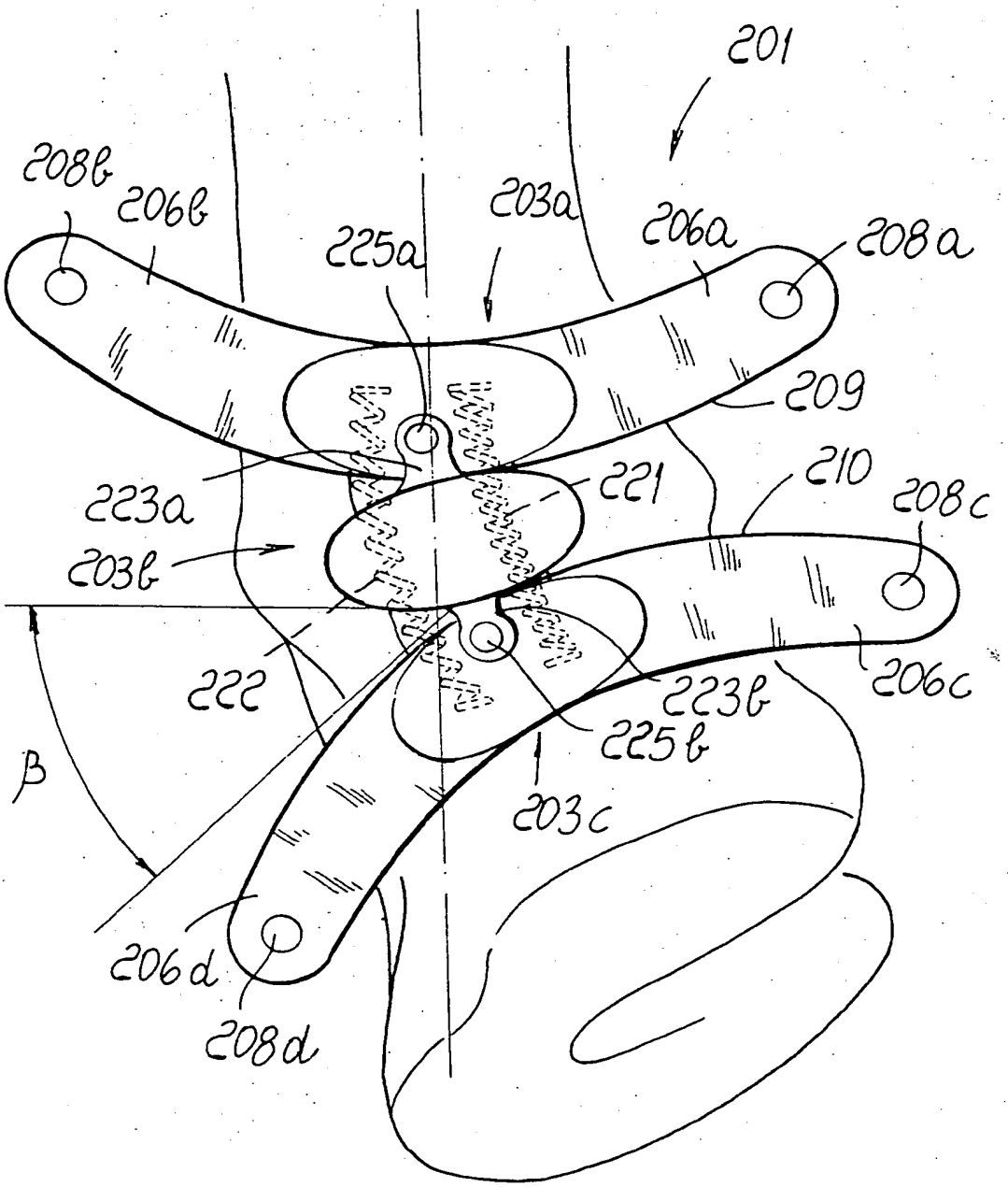

Fig. 15

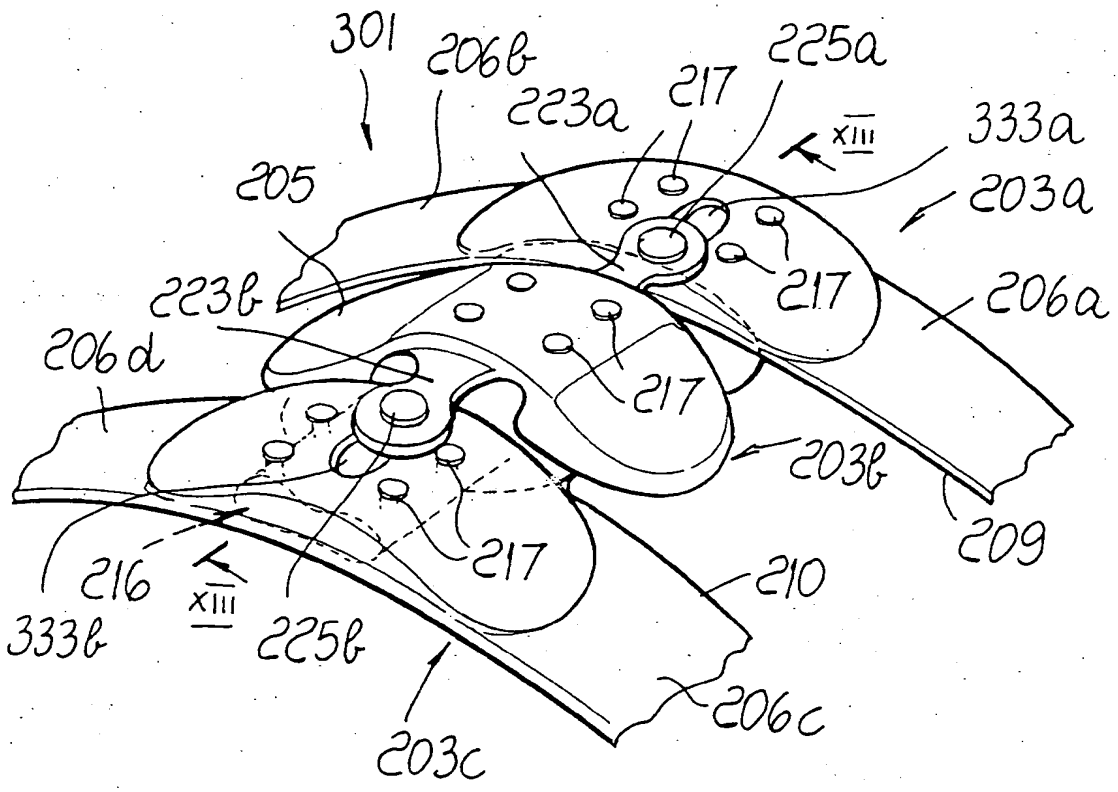

Fig. 16

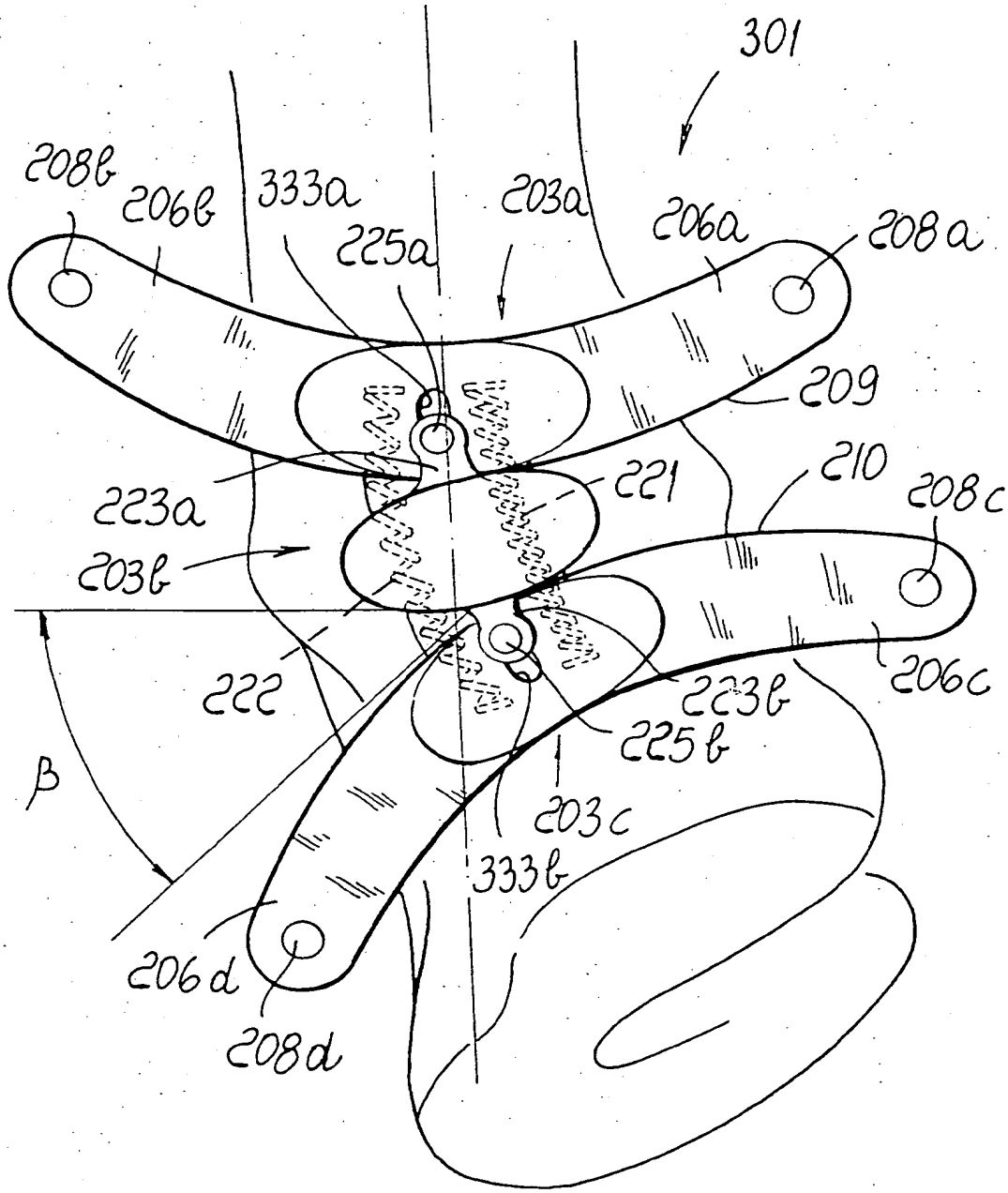

Fig. 17

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 10 0549

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A,D	EP-A-0 455 104 (NORDICA) * the whole document *	1	A43B5/04 A43B5/00
A	US-A-5 269 079 (R. KUNSTADT) * the whole document *	1	
A	EP-A-0 430 821 (SKIS ROSSIGNOL) * the whole document *	1	
A,D	FR-A-2 358 119 (OLON CORP.) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 March 1996	Declerck, J

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